SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1687.—Vol. XXXVII. LONDON, SATURDAY, DECEMBER 21, 1867. {STAMPED .. SIXPENCE. UNSTAMPED. FIVEPENCE.

Original Correspondence.

COLLIERY WORKINGS—THE DOUBLE-SHIFT SYSTEM.

Rossie Priory, Dec. 16.

SIR,—May I request you to insert the enclosed in the Journal?

KINNAIRD.

[COPY.]

117, *Westbourne-terrace, Hyde-park, W., Nov.* 26.

Mr. Nixon begs to present his compliments to Lord Kinnaird, and has taken the liberty to forward by book-post a copy of the *Mining Journal*, containing a letter written by him, which shows that the number of lives lost by the Ferndale Colliery explosion might have been reduced to half the amount had the "double-shift," or Northern system—instead of the "single-shift," as practised in South Wales, Yorkshire, Lancashire, Derbyshire, and other coal districts—been in operation. (See pp. 787 and 794.) Also a paper read by Mr. George Brown, mining engineer to Messrs. Nixon, Taylor, and Co., of Cardiff, in which the details of the two systems of Double and Single Shifts are fully set forth. (See page 11.) Mr. Nixon will have great pleasure in giving Lord Kinnaird any further information in his power in respect to so important a subject.

[COPY OF REPLY.]

Rossie Priory, Inchture, N.B., Dec. 5.

SIR,—I beg to acknowledge the receipt of your letter of Nov. 26, with a copy of the *Mining Journal*, containing your suggestion of rendering compulsory the double-shift system. I quite admit that in many respects the double-shift would be advantageous, but I do not see how it is possible, by legislation, to restrict the hours of adult labour to the extent you mention. No doubt, if the present system of management continues, the casualties will be increased rather than diminished; and if your plan were adopted, by which one-half only of the men were employed at one time in the mine, the number of deaths by accident, which amounted this last year to 1486, would have been one-half less in proportion to the fewer number exposed to the risks of casualties, but I do not see any reason why even this reduced number of valuable lives should be sacrificed if, as I think, it can be shown that by the adoption of precautionary measures and of scientific inventions, these accidents might be reduced to a minimum. The *Mining Journal*, in its remarks on your communication, states, as one great advantage to be derived from your plan, that "no working place is left continuously in the care of one set of workmen. With the single-shift system, the men are too apt to devote all their attention to sending up a quantity of coals, even to the neglect of the necessary considerations of the state of their working places; but if two sets are working alternately, each will take care that the previous one has left everything in proper condition." This is clearly suggestive of constant supervision—not necessarily by Government Inspectors—but that a set of men, apart from the coal getters, should have the charge of the workings. The enumeration you give of the advantages which would result from the adoption of the double-shift is most valuable from one of your experience, proving clearly that those fearful accidents result, in a great measure, from the following causes:—1, the want of proper ventilation; 2, the want of caution in the working, especially of fiery mines; 3, the want of guarding against falls of the roof; to these might be added the absence of proper machinery, in the shape of safety-cages and catches. Your views coincide in a remarkable manner with those entertained by one who has worked his way up from a common miner. I quote his own words in the following extract:—"There is even at the present time knowledge sufficient, if practically applied, and wisely and strictly enforced, to prevent, in a great measure, the vast sacrifice of human life which is so frequently happening in our coal mines. I think, as I said before, making profits is the first consideration with many colliery masters; there are honourable exceptions to this, but the general rule is large profits. I may ask, when do the most explosions and the greatest loss of life take place? Why, in the winter months. And why is it that this happens *then* more than in other parts of the year? Because the colliery master urges his manager, and the manager urges his fireman, overman, or deputies to exert and pay their whole attention to get out as many coals as they can, in order to meet the increased demand; this causes extra work to the fireman, deputies, &c.; and what follows? why, they neglect that work which is not always before their eyes; and what work is that? why, the air-courses in the back roads, which no one seldom travels over; and what is the result of neglecting to look after the air-courses? dirt and stone fall, or the floor of the mine lifts up and reduces the size of the air-courses; and what is the consequence? why, it prevents a sufficient quantity of pure air from getting into the workings, as it prevents the foul or bad air from getting out; and what is the result? gas or fire-damp accumulates, and the finishing stroke is—an explosion. I speak not from theory, but from careful and personal experience of many years. I will now adduce another instance, which, although of almost daily occurrence, seldom, if ever, comes to light. As one can easily imagine, neither master nor manager like a report to be circulated that there is either fire-damp or any other danger in the colliery to which he belongs, so the firemen or deputies, when they find any fire-damp accumulated, keep it quiet and unknown, for if they had to speak about it, and the rumour be spread amongst the workmen, they might, perhaps, leave off work, and then the deputy or fireman would soon after lose his situation. Thus gas is often allowed to stand in an outside place for weeks together, and often do workmen go into places of this kind, ignorant of the deadly enemy until they plunge into it, and cause an explosion. I might go on multiplying causes which lead to loss of life, but I will only notice one more at present. Some men who are interested have set up a theory to account for the cause of explosions. The rise and fall of the barometer is made much of just now. I am a great advocate for everything that science and ingenuity can devise, but I do not see how watching the barometer can do much to prevent explosions. Then I would have a barometer, thermometer, and every other instrument which would assist me, placed in the pit; but to pretend to lay so much stress upon these things, while the real cause is hidden elsewhere, is a mere farce. Accidents and explosions happen, and will happen, until there are some real practical men to go into the mines, and travel through the various air-courses, and thoroughly inspect the workings, and when they see any real cause of danger, have power to order its removal. Such is my experience, and such it has been for many years."

The blame is very generally cast on the poor miners, though it is a notorious fact that the ventilation of the mines is imperfect, and that the men are frequently kept in ignorance of the dangerous condition they are in. One great objection to the adoption of Mr. Ansell's indicator being admitted by those connected with mines to be that the men would not go to work if they saw indicated the amount of dangerous gas in the pit. Even in the case of sudden irruptions, if the men were supplied with the self-extinguishing Davy lamps, there would be less danger.

The *Mining Journal* states that colliery owners, mine viewers, and mining engineers would be only too thankful for the appointment of a Royal Commission, but proceeds to remark—"Seeing, however, that the Select Committee on Mines have only just concluded their labours, it may be a matter for consideration whether the further cost of a commission is now called for. Further legislation there will be; and the report of the Select Committee, and the recommendations of the Mines Inspectors, by which the report was accompanied, point to the direction which that legislation will take—probably more inspection, and an increase of the restrictions already placed on colliery proprietors in the development of their property; with the probability of this it might have been thought Lord Kinnaird would be satisfied." Now, it happens that the Committee was appointed only to consider the grievances complained of by the miners, which grievances arise from the omission of certain provisions in the former Mines Bill, clauses being struck out at the suggestion of those connected with mines in the Upper House. This committee, in the composition of which the mining interest preponderated, were precluded from the consideration of causes of accidents, and did not, therefore, report on many useful inventions for their prevention, which were brought before them. Committees are a very convenient mode of shelving troublesome questions; whereas Commissions, although their report may remain a dead letter, generally elicit the truth; and if I succeed in getting a Commission appointed, your valuable suggestion will be considered.

KINNAIRD.

John Nixon, Esq., 117, Westbourne-terrace, Hyde-park, W.

MINES INSPECTION.

SIR,—The remarks of your correspondent, "Nemo," and those in your leader, in the Journal of Dec. 7, on this important subject, are very much to the point. "Nemo" and the public need not wonder that the northern district got on for six months without an Inspector, if they make themselves acquainted with the work done by an Inspector from year to year. The iron and coal trades know the extent of their usefulness, and properly estimate their pretended important duties. The *fact* is that they do little or no duty, beyond noting deaths and injuries in and about pits, and reporting the same to the Crown authorities. In their annual reports there is ample proof of this statement. It is notorious to everyone in the trade of mining that an Inspector is only seen after an accident. I venture to say that no practical suggestion, in the way of an improved method of working coal, whereby a less loss of life would be the result, has ever been offered by any one of the Inspectors. I maintain that they are of no use in regard to the working and conducting of mines, or in the saving of life therein, and that, instead of being useful in either respect, they pass their time with what is again taken up by the Coroner in England and the Fiscal in Scotland. Inspectors, as a rule, never go down a pit, unless an accident has occurred, and when down content themselves with enquiring into the cause of such accident, and probably telling the parties interested that they have neglected this or that, which at the *time of the inspection* is as apparent to the one party as to the other.

No one connected with mining will deny that great benefit has resulted, both to employers and employed, since the Mines Acts were introduced. Deaths and injuries have decreased and are decreasing through their agency, apart altogether from inspection. The admirable general and particular rules which form the basis of colliery management have been the chief means to improvements in mining. The enforcement of these rules is all the Government can do, the practical part must be left to those in charge of the mines. Now, the question is can these rules not be as rigidly enforced without Inspectors as with them? I answer that the machinery of the Acts brings out the fact of a colliery not working under the rules, and that the Coroner or Fiscal is the officer who puts the Acts in force. So far as inspection goes just now, and I see no need for it going further, it is only *when an accident occurs* that it is discovered that a colliery is working contrary to the Acts, that being the only time that an Inspector makes his appearance. Now, according to the Acts, the owner of the colliery must notify the accident to the Inspector, and also to the Home Secretary in England, and Lord Advocate in Scotland, and the case is investigated into exactly as a criminal case. The Inspector merely acts as a witness, and in most cases he is only a second-hand witness.

If the duties of Inspectors be as I have stated, it does look a farce to subject a candidate for the office to a civil service examination. The duties are those of a policeman, and I believe this officer is used in mine accidents as effectually as Inspectors.

Referring to your leader, there is a wide difference between "inspection" and "management." If the public think that accidents are to be done away with through Inspectors, it is a mistake. It is to management alone that we must look for a diminution of accidents. From the constantly varying circumstances of a colliery, and from the immense number of them in this country, it is simply ridiculous to talk of inspection, as at present in force, as a preventative of accidents. Inspection, to be of any use, must go daily hand in hand with management. Before increasing the number of Inspectors it would be well to consider how far the present ones are of any use.—*Glasgow, Dec.* 13.

OBSERVER.

MINE INSPECTION—CIVIL SERVICE EXAMINATION.

SIR,—Your correspondent, "R. A.," falls somewhat into error in his remarks on my letter published in the Journal of the 7th inst. Rumour did not *appoint* the two gentlemen, it only *nominated* them. I did not go so far as to say, moreover, that the Home Secretary made an "injudicious" appointment, but I did intimate that, of the three, the gentleman appointed has had the least amount of experience, that he is young, and that "in making such an appointment more attention should be paid to accertain whether the candidate has displayed more than average skill in the management of the collieries entrusted to his care than to the testing of his power to pass the Civil Service Examination." Now, a *young* person cannot have had opportunities of distinguishing himself in the management of collieries, and I believe it is not too much to say that Inspectors have been appointed who have *not* had the management of collieries, but have had charge *under* a "chief viewer," and I do think this is undesirable. "R. A." says "probably the Home Secretary thought the fact of a man being a 'decent fellow' was not sufficient evidence of his fitness for an Inspector, and, therefore, adopted the wiser course of ascertaining the qualification of the candidates before making the appointment." This is just the thing I wish to aim at. *How does* the Home Secretary "ascertain the qualification of the candidates?" "R. A.," to some extent, and apparently authoritatively, tells us that we may rest assured "that the autorities use every effort to appoint one that will give satisfaction to the *largest possible number of those interested.*" Why, this was almost the moving cause of my writing (and here I cannot say what I otherwise might, lest it may be considered that I am alone condemning the recent appointment, which is not the case) that some of the appointments have *not* given satisfaction to the largest number of those interested. Again, we may ask, what are the *efforts* the authorities use?

So far as I am aware, the mode adopted by gentlemen seeking the appointment of Inspector is to make written application to the Home Secretary, such application being accompanied by copies of testimonials from viewers, &c., of various supposed shades of eminence. And as far as this goes it is right enough, but it is a fact not to be contradicted, I think, that when a vacancy occurs there is terrible hunting after *influence*, in the shape of Members of Parliament, &c. This has become a standing joke in coal mining circles. I know several gentlemen who have been applicants on various occasions, and who are in every respect well qualified for the office, and who have had ample testimony as to their fitness, but who have never had an opportunity of proving their qualifications in any way whatever. How does this occur? It has been stated, but with what degree of truth I cannot say, that the President of the Northern Mining Institute has been sometimes consulted in appointing Inspectors. This, too, I consider objectionable, although one more fitted to judge of a candidate's qualifications than the present esteemed President it would be difficult to conceive; but yet it should not be left to the *ipse dixit* of one man, however eminent, to set aside worthy candidates; and we are all human, and it is not an impossibility that even a President of the Mining Institute might have favourites, and not only so, but the Presidents of the institute are gentlemen who have the management of collieries, and might possibly have collieries in the very districts where an Inspector to be appointed would have to exercise his functions, and in such a case the assistance of a Pres ident being asked would be manifestly unfair.

I fail to see a better method than that suggested by me in my last—to leave the choice of Inspectors to a committee of the Inspectors, or to the two named in my last. Of course, objections could be found to this, but in the choice of evils I think it is the least.

In my next I hope to have time to write of the propriety and necessity, as I think, of appointing additional Inspectors—after that, of increasing their remuneration; and I would ask the indulgence of *critical* readers, as my time (or want of it) will not permit me to put my language into the *trim* shape that I would wish.

NEMO.

Dec. 17.

SAFETY-LAMPS, AND COLLIERY EXPLOSIONS, &c.—No. II.

SIR,—The result of the late experiments with safety-lamps has caused much excitement, and, indeed, a sort of panic, hence the result is naturally a great number of new inventions—or rather, perhaps, strictly speaking, they are only modications of lamps that have been long in use. The sole object of those alterations, or improvements, appears to be to make the lamp safer and more secure, and especially to guard against the passage of the flame when the lamp is exposed to an inflammable current moving at high velocities. Now, we have shown in a former letter that the velocities necessary to force the flame through the gauze are seldom, if ever, met with in mines; yet this is no argument against a better lamp, if that lamp really prove better in every respect, and of a practical kind; but this is exactly the point in which most new lamps fail. It must be borne in mind that the main use to which safety-lamps are now applied is the detecting of gas; they are not allowed to remain in an explosive mixture after the presence of gas is once detected. At any rate, this is the practice where the rules are complied with, and it ought to be rigidly adhered to in all cases. Now, so far as I am aware, the Davy lamp is the only good one for detecting gas. The Stephenson, a most admirable lamp, has always been considered very much inferior to the Davy in this respect.

Will any of those complicated machines with double glasses, double gauzes, and extra screens at top and bottom, &c., serve the purpose above indicated, or will they prove sufficiently portable and adapted for general use in the mine? Unless a lamp can be found having all those properties—that is, quite portable and handy to carry about the mine, and, at any rate, as sensitive in showing when gas is present as the Stephenson lamp—it is quite certain that the miner will

be very slow in discarding the lamps at present in use, and adopting new ones.

Perhaps the most useful office of the safety-lamp at present is to guard against sudden blowers, and the coal seams in some districts are very liable to sudden discharges of this kind. Previous to the discovery of the safety-lamp these sudden blowers frequently caused mischief and alarm, but with the use of the safety-lamp notice is given, and the men make their escape as quickly as possible. There does not appear to be much danger of an explosion under any circumstances that have yet arisen where the Stephenson lamp is in use, as no case of explosion has been recorded arising from this lamp. However, as remarked above, if a lamp safer and equal in all other respects to this lamp can be got it will be hailed with delight; but it is much doubted whether this has as yet been achieved.

Dec. 18. M. E.

ANSELL'S FIRE-DAMP INDICATOR.

SIR,—A correspondent, "F. A.," in last Saturday's Journal, says, in reference to this instrument, that it may undoubtedly be relied upon to give the correct percentage of explosive gas in a mine. His subsequent remarks are not, I think, quite to the point. Granted, that the percentage of gas may be correctly ascertained with that instrument, how may it be turned to practical account? To say that the strength of a chain is equal to its weakest link is a truism which most persons know, at least those with any pretensions to knowledge. To say that the *return* air-ways do not represent the actual state of the air in a colliery turns, of course, upon the question of the *point* of such returns examined. Supposing a man to be sent to a colliery to test its returns for gas, he would show great unfitness for such an office if he only tried the air at the point close to the furnace. Examinations should be made at many points along the course of the air-ways, wherever gas may be suspected to lurk in greater quantities. Your correspondent will scarcely say that the danger lies *out* of the air-ways, or beyond their reach; then, if there is a dangerous district in the mine, why should it necessarily escape examination and detection; the fact that there is such a dangerous district in the colliery insufficiently ventilated should be certain of discovery by the examiner, and the Government Inspector be apprised of the danger. Thus, the returns that may be made to the Inspector of the percentages of the gas should, and, doubtless, would, show not only the general, but the particular state of the air in the different parts of the colliery. Suppose the Society for the Prevention of Steam-Boiler Explosions sent an agent to examine a boiler, would that man be considered as having done his duty if he merely examined the most accessible parts only; would not the danger be considered to lurk more in the flues, and where the boiler rested on the walls? And supposing an examination of a colliery to be made with one of Mr. Ansell's indicators, does it follow, as a matter of course, that only the purest parts of the return would be examined, and not the parts most likely to be more foul? To say, then, that periodical returns of the percentage of damp in the air-ways of a mine would be worthless to the Inspectors is, I think, not so clear as your correspondent seems to imagine, supposing the examination to be made by a competent and discriminating person.—*Taff Vale, Dec.* 17. W. L.

ITEMS OF INTEREST FROM NOVA SCOTIA.

SIR,—Dr. Sterry Hunt, the celebrated American geologist, has just returned from a simi-official tour through the several gold districts, and expressed himself much gratified with all that he saw. Dr. Hunt's visit was partly at the request of Sir Wm. E. Logan, the director of the Geological Survey of Canada, who is greatly interested in the mineral resources of Nova Scotia, and particularly anxious to obtain reliable information with regard to the extent of its auriferous quartz zone. Dr. Hunt has discovered some very important facts relative to the course of the lodes, and his report will be looked forward to with interest by the scientific and mining world.

The so-called Norwegian mortar-box (referred to in the Journal of Nov. 16) is, after all, no new invention, the principle having been in use in Colorado over two years, where it has been practically abandoned. The patent, therefore, cannot hold good in this country, more especially as it has transpired that it could be seen in operation in the United States when first the patent was applied for.

The value of gold mining lands is rapidly increasing, and large purchases have been made within the past month, both for purposes of speculation and for *bona fide* working. The returns for all districts for the official year ending Sept. 30, 1867, exceed by 3401 ozs. 1 dwt. 22 grs. the yield for 1866. A. H.

BORING MACHINES FOR MINES, TUNNELS, &c.

SIR,—The progress of mining operations in all kinds of rock is necessarily slow, and in hard rock excessively so; consequently the miner, however well skilled he may be, is very often baffled in his attempts at extending operations at anything like desirable speed. The sense of the want of more rapid and economical operations in rock has led engineers in England, on the Continent, and in America to attempt to devise means whereby the excessive time and money expended therein can be alleviated, by more or less relieving both, The manner they generally seek to do this i. by multiplying the blasts. Physical force having been tested to its fullest extent for that purpose already, it remains that mechanical force must perform the task, if performed at all. This has brought a great number of inventions before the public in the shape of boring machines, to be driven by steam or water power, for the purpose of drilling holes in rock at a much more rapid rate than can be done by physical force, and thereby increase the number of blasts in a given time.

Owing to the peculiar motions required to be performed by boring machines, in order to make them practically adequate to their intended work, and the great difficulties attendant on the situation the machines have to perform their work in, the successful application of the same is attended with very ponderous difficulties indeed. To meet the whole of these difficulties, considerable ingenuity has been displayed by the designers of boring machines, and very diversified is the construction of many of them, although certain general principles are embraced, more or less, by all.

Multiplying blasts is the general means whereby it is sought to excavate rock more rapidly, yet it is not the sole means. Boring machines have been, and are being, introduced, by which means it is sought to dispense with blasting altogether, by boring the levels, tunnels, &c., at their full size. Many machines have been tried underground in mines, and in tunnels connected with railways, &c., with varying results, some of which trials are stated to have been practical successes, which cannot fail to be satisfactory to those immediately interested, as well as to the public at large.

A large portion, however, of the trials made by boring machines introduced to the public for their patronage and support have been at surface, in exhibitions, foundries, &c. This is of vital importance, considered in the light of making the machines known. But, however good the results of trials made under such circumstances may be at surface, that does not solve the required problem. The problem to be solved is this:—Actual profits made from fair trials in real practice underground. Until this is demonstrated in an incontrovertible manner the public will not give the subject the earnest support it is entitled to. The results given in the bottom ends are those that will tell, not those in the foundry and exhibition. The introducers of boring machines appear to be acting under the impression that surface exhibitions and trials will be sufficient to establish the efficiency of their respective machines in the eyes of practical men: but in this they are very much mistaken, as practical men hesitate about spending money on them without positive demonstrations of their economy and value; and well they may hesitate, as there can be little doubt that some of the machines may give very different results in actual practice underground from those at surface. While nothing short of the clearest demonstrations to the effect that boring machines can be profitably used in mines, &c., will convince practical men, yet the success achieved in different parts of the world in that respect are paving the way for their introduction. And there is a growing interest in the subject, and which is taking deep root in the minds of those whose interests it affects, which will, no doubt, tell eventually most favourably on the subject.

Although the difficulties of introducing boring machines in mines, &c., are no doubt very great, yet the importance of the subject is greater, and it is to be hoped no reasonable exertions will be spared in accomplishing the task. Great as the obstacles may be, there are no engineering or mechanical difficulties connected with the whole subject that cannot be successfully met and overcome.

Bodmin, Cornwall, Dec. 16. GEORGE RICKARD.

ROLLING GIRDERS AND PLATES.

SIR,—A paragraph in last week's Journal, announcing that Mr. T. H. Head, of Teesdale Ironworks, has taken out a patent for rolling the edges of plates without shearing, I beg to observe that I took out a patent on Dec. 8, 1859, for England, France, and Belgium, for the application of vertical rolls for rolling girders and plates, and any patent taken out since that time is void. I offered my patent to many of the leading ironmasters in England, but none of them were far-sighted enough to avail themselves of it; not so, however, with the French and Belgians, who have had my plan in operation some years. Need it be wondered at that the foreigners have got ahead of us, when our ironmasters have been contented to work on the old plan, and allow their own countrymen to seek a market for inventions abroad. I shall be glad to manufacture them for anyone who may be in want of them. JOHN ARROWSMITH.

Oxford-street, Bilston.

THE QUEBEC HYDRAULIC CEMENT.

SIR,—In continuation of my letter on the subject of the "black rock" of Quebec, and the hydraulic cement derived from it, published in last week's Journal, I now first submit an extract from the copy of the letter dated Quebec, Nov. 3, 1834, alluded to therein, which, by an oversight, was left out:—

SIR,—I have the honour to send, with the approbation of Colonel Nicolls, some specimens of water cement, manufactured from the "black rock" of Quebec, which, mineralogically, may be considered to be either a carbonaceous clay-slate, or argillo-silicious and carbonaceous limestone; while, geologically considered, it appears to be a transition clay-slate, sometimes passing into, or interstratified with, a transition limestone. I am not aware that this rock has been submitted to a chemical analysis, but its mineralogical characters indicate the presence of silex, alumina, carbonate of lime, carbon, bitumen, sulphur, or sulphuretted hydrogen, and iron. The proportion in which the three first of these constituents appeared to be present in some portions of this rock induced me, some years ago, to suspect that they might form, when burnt and pulverised, a water-setting plaster or cement. I was not, however, at the time, aware of the importance of making use of the powder in a state as nearly as possible impalpable, in consequence of which my first experiments failed. Meeting afterwards with Colonel Pasley's pamphlet on the subject of water cements, it was immediately noticed what importance was therein attached to that circumstance, which led to a repetition of the experiments, acting on this precaution, and the accompanying specimens are portions of the result, &c.

I now offer some further observations on the geological and mineralogical character of this rock, much of which is copied from an anonymous pamphlet, edited by myself, designated "Localities of Canadian Minerals," published under the auspices of the Literary and Historical Society of Quebec, in the year 1827, but which has had no circulation out of Canada, and, indeed, little in it. The rock of Cape Diamond, commonly called the "black rock," on which is situated the citadel of Quebec, is composed of alternating strata of argillite and limestone of Silurian age, both remarkable for their blackness and carbonaceous character, particularly the former strata. The general dip of these strata is to the south-east, and consequent bearing north-east south-west, but owing to disturbing causes having produced local flexures, there is great difference sometimes both in the dip and bearing; occasionally they appear to have undergone a complete reversal, and to have become curved and convoluted since they were deposited. The thickness of the strata varies from 3 ft. to 3 in. The former are often, to all appearances, of a very compact structure, breaking often with conchoidal surfaces and sharp edges: weathering, however, effects that the hammer fails to do, and displays its schistose structure. It is on account of this structure, and its absorbent character, that the "black rock" is not a good building stone. The thin strata are generally schistose, even in appearance, but they are sometimes compact, and break under the hammer into oblong prismatic pieces, which yield a ringing metallic sound when struck. These separate the thicker strata at certain intervals, and often determine the planes of stratification when they might otherwise be doubtful, from the resemblance which the whitened and even surfaces of the natural joints sometimes bear to them; but their non-continuance is another useful test of stratification. All the strata, however, both thick and thin, as a general fact, undergo the abrading action of the Canadian winter, and often pass, if exposed, into a debris of schistose fragments; at least, such is the case with those strata which crop out in the neighbourhood of the citadel, to which my military duties in a great measure confined most of my observations.

Among the peculiar appearances common to the "black rock" of Quebec, and displayed by fracture, is a ribbed aspect; another is a glossy convexity of surface, resembling polished shoe leather. The effect of weather is also sometimes remarkable; in some cases it exhibits the schistose structure; in others, more compact, it shows a rounded and whitened surface, forming a striking contrast with its sooty interior; while, again, in other cases, by the rounding of successive laminæ, a series of concentric irregular ovals are formed, much resembling the grain of fir, and when such surfaces are browned or reddened by exposure, or oxidation, a singular imitation of wood is produced. In excavations strata are met with the colour of which is a lively green; these have for the most part undergone a considerable degree of induration, and resemble flint in fracture, translucency, hardness, and the effect of the blow-pipe. Spheroidal concretionary lumps of the same, and of a dark grey variety, are common. Some of the strata, the blacker and often more glossy varieties, do not appear to contain any carbonate of lime whatever, as they exhibit no effervescence in the mineral acids; others do so, but never strongly. It is among these latter, which are always lighter coloured than the former, that the hydraulic lime is met with.

The detached minerals found in the "black rock" are—

1. Iron as an oxide and as a sulphuret. The former, in a state of solution, often bestows a red or or yellow stain on the surface of the rock; the latter is not so common, and is generally found with a soft greenish variety of the rock (query, chlorite?)

2. Quartz in fine acicular prismatic crystals of considerable transparency, as also others approaching the form of the double six-sided pyramid, applied base to base, with sometimes short intervening six-sided prisms. More frequently it occurs in ill-formed semi-transparent prisms. These crystals vary in size from drusy to others as large as the thumb; the latter are never transparent throughout, and often appear as if in the progress of formation. Twin crystals are sometimes noticed.

3. Calcareous spar, in white and brown acicular crystals, finer than spun glass, radiates from a white calcareous base, often enclosing ill-formed crystals of quartz, also in perfect rhombs; but its most common appearance is in veins of a laminar structure traversing the rock in all directions. These in some places become so numerous as to give the rock the aspect of a conglomerate. They often traverse each other, and in that case one vein sometimes appears to have dislodged that portion of the other it met with in its formation, the effect, as it would seem, of uncontemporaneous fracture.

4. Naphtha, in soft, transparent pieces, of a green and yellow colour, sometimes surrounding the root, more rarely insinuating itself into the interior of a crystal of quartz, and melting under the application of heat.

5. Coal dust or soot often investing the surface of quartz crystals in drusy cavities.

6. Fluor-spar, as far as my own observations extend, is by no means common. One specimen of an imperfect crystal we have seen. Its colour was a deep purple, so intense as to render the crystal scarcely translucent. Its form is that of a cube. It was found associated with calc-spar in a crevice of the "black rock," on which it is sometimes found in thin crusts or plates, slightly shaded with a purple tinge. Divided diagonally the mineralogical characters of that portion of the rock most likely to yield cement are as follows:—Colour, brownish or greyish black, opaque; structure compact, fracture uneven, somewhat conchoidal, usually breaking with sharp edges, scratched by the knife, but not very readily. Colour of powder, reddish ash grey; streak reddish grey. Exhales the bituminous odour when struck. Moderate or feeble effervescence in the mineral acids. Before the blow-pipe it forms a yellowish or brownish enamel, and the part furthest from the flame is whitened.

The earthy minerals above named occur for the most part in crevices and small fissures in the rock. Small traces of both lead and coal have been met with in crevices, but not on the lake side towards the citadel and harbour.

In conclusion, for most full and satisfactory information in every way connected with the geology and mineralogy of Canada, I cannot do better than refer the reader to a quarto work published in the year 1863, entitled "Geological Survey of Canada," the report of which has been drawn up by the principal officers of that survey—Sir Wm. Logan, director; Alexander Murphy, assistant geologist; T. Sterry Hunt, chemical mineralogist; E. Billings, palæontologist.

F. H. BADDELEY, Major-Gen R.E.

SLATE QUARRY REPORTS.

"To gild refined gold, to paint the lily, is wasteful and ridiculous excess."

SIR,—I hardly expected that the experienced Editor of so long established and valuable a paper as the *Mining Journal* could have been drawn into the grave error so elegantly condemned in the above quotation. I thought, also, that correspondents were left to speak for themselves, and that it was *infra dig.* for the Editor to volunteer *excathedra* comments. Such a course of proceeding must soon inevitably produce its natural results. But, irrespective of the unusual character of the "Editorial" remarks in your last week's Journal, your readers must have wondered at seeing this remarkable attempt to prove something which had never been disputed. In my letter of the 7th inst. I described Mr. Haywood correctly, it appears, as the surveyor of the turnpike-road; and, if my description were not sufficiently elaborate, Mr. Haywood, in his letter in the Journal of the 14th inst., supplied the deficiency, and appended the following to his signature:—"Government Engineer to the Shrewsbury and Holyhead Road and the Menai and Conway Bridges, and the Surveyor of the Northern Division of the Carnarvonshire Roads."

Surely this was sufficient identification and proof that I had not made any mistake in the description, but only omitted (which I would not have done if I had been more fully informed) the revelation of all the confidential trusts in roads and bridges with which Mr. Haywood had been honoured. So much for this; but why you should have repeated the dose is to me a perfect puzzle, and I may say that I consider Mr. Haywood the more competent exponent of his own status.

I perceive that Mr. Haywood is very angry; but, as anger is a long way from argument, and is often dexterously used as its substitute, I will deal first with the argument (if I can find it), and lastly with the anger.

I never disputed Mr. Haywood's right to report on a quarry or anything else; but when a paragraph appeared in the *North Wales Chronicle*, informing the world that Mr. Haywood had reported on and condemned the Llanfair Quarry, residents in his own neighbourhood, who did know Mr. Haywood, did take the liberty of asking such questions as I repeated at the Llanfair meeting. I am neither responsible for their audacity nor for the uncomplimentary terms used by them in reference to what Mr. Haywood calls his "report." I fear the publication of that document, and of a report from Mr. Kellow on the same same property in juxtaposition, was rather too much for Mr. Haywood's equanimity.

Although the correspondence appurtenant to Mr. Haywood's has been exhibited in support of that gentleman's statement, no one has ventured to criticise Mr. Kellow's report, whose letters and testimonials appear again in the same paper. Thus much by the way.

Mr. Haywood's letter, for it would be a perversion of language to call such a document a report on a slate quarry, bears as much relation to a report as a stone-crusher does to a mathematical instrument. The one, like a sledge hammer, requires physical power for its use, and very little more than the same power for its construction. A mathematical instrument requires for its production and skilful application the triumph of mind over matter. This manifest contrast exhibits the difference between Mr. Haywood's letter (which I dare say he did not wish me to print) and a report on a slate quarry. In that happy position I leave this precious document, so coolly called by the author his "report," and recommend your readers to study it well, and obtain therefrom all the geological and scientific information which such a document ought to present to enquiring minds. At least they can learn therefrom how small a modicum of either will qualify for writing reports on slate quarries.

Now I must have a word or two with the other parties forming the group, and eventually I may relieve Mr. Haywood's anxiety by letting him see that I have not altogether taken leave of him. I did not intend to hurt the feelings of Mr. Macdougall Smith by saying that Mr. Haywood carried him with him in his expression of opinion. *I have a right to my own opinion*, and I cannot help fearing that there may be some latent truth in the idea, for Mr. Smith displays more irritation than the remark would seem to justify, except on the supposition of an unpleasant, innate, consciousness of the fact.

What does Mr. Smith mean by the following:—"The structure of the slate rock proves hard, and very imperfect for being worked economically or profitably." This may be a highly scientific, refined, and luminous description of something which one ought readily to comprehend; but I confess I cannot understand it. Possibly its very excess of brilliancy prevents an ordinary mortal from perceiving what the author intended to convey. Respecting the bevilled edges and "no true split," Mr. Smith has made a discovery in the blue vein which previous explorers have failed to do. But he has also discovered that "the vein is also crossed by a post." Did Mr. Smith ever see a quarry without a post? How many posts are there in the Penrhyn Quarries? I must not tarry by the way to discuss what a post is; but I venture to say that if Mr. Smith will again meet me at the quarry that I will demonstrate clearly, while he is there, that there are at least two posts in the quarry. But he does not exactly agree with Mr. Haywood on another and an important point. Mr. Haywood says there *are* indications of improvement in the lower level. Mr. Smith says "I am decidedly of opinion that the slate rock does *not* improve." On this point, at least, it must be admitted that Mr. Haywood did not carry Mr. Smith "with him in his expression of opinion." Now, neither of these statements of Mr. Haywood or Mr. Smith will bear a moment's test by a practical quarryman. To speak of indications of improvement is to use an equivocal term, evidently wrung out in spite of a foregone conclusion. The simple fact is, as the merest tyro can see, that great *and unmistakeable improvement has taken place* in the slate rock from the upper to the lower level. Mr. Smith further states that "the immense mass of hard rock between the green and blue veins must always be a barrier to profitable working." Why a barrier to profitable working? A level or levels must go to the back of the green vein before it can be worked at all, and when driven the vein can be worked for half a mile in length in chambers north and south. What has the hard rock through which the level passes before it reaches the green to do with this spectre of "a barrier to profitable working?" Why, the level from the back of the blue, through the hard and through the green is only about 200 yards in length, while the level into and through Mr. Wyatt's Croeser Quarry is more than double the length, and nobody ever thought that the length of the level before they came to the slate rock in that quarry "must always be a barrier to profitable working." We do not require water or steam power for any purpose in the quarry, and should not, probably, for a hundred years.

Mr. Smith admits that 600 tons of slate have been made out of this quarry. If his report be an unexaggerated statement, it will be a wonderful puzzle to your readers to discover from what secret corner these 600 tons of slate came. Take his report, paragraph by paragraph, and you cannot extract a single good slate out of the whole thing, and if you did find one Mr. Haywood's stone-crusher would soon demolish it. However, perhaps I have no right to look for more evidence of practical slate quarrying experience from Mr. Smith, as I presume he set his standard of qualification in his mild letter, to which I have referred, when he stated, "if men would take the opinions of *honest, practical mining engineers*, instead of the absurd theories of *ignorant and vain persons*, there would not be the ruin and disappointment which has occurred during the last few years." The mining engineers are generally the ignorant and vain persons, who pretend to a knowledge of *slate* and *slate quarries*, of which, in nine cases out of ten, they are profoundly ignorant; and such persons have yet to learn that a simple quarryman has more real knowledge of the subject than they will ever acquire in a lifetime.

But Mr. Spooner comes to the rescue of Mr. Haywood, and reports

what he *thought* about three years ago, as confirmatory of what Mr. Haywood *saw* two or three weeks ago. Mr. Leckey follows next, who saw "a fair block, but really of so small an extent that it was nothing to trust to." He does not enlighten us, either, as to where the 600 tons of slate came from—query, from Valencia? Mr. Wyatt also kindly mentions interviews with Mr. Haywood, as furnishing evidence of his ability and qualifications to report on a slate quarry. And last, not least, comes Mr. E. Evans, Mr. Haywood's own submanager, who had previously reported on and *against this* quarry about 18 months ago, and who on the occasion in question attended Mr. Haywood through the quarry. He, of course, recommends Mr. Haywood highly; but where are the reports on quarries inspected by Mr. Haywood, to give practical evidence, not alone of his *willingness to inspect*, but of his ability to report on so peculiar and scientific a subject as slate quarries and their geological condition, as well as engineering facilities. After all this array of evidence, I am forced to the conclusion that there is strong and abundant testimony that Mr. Haywood is the "Government Engineer to the Shrewsbury and Holyhead Road, and the Menai and Conway Bridges, and the Surveyor of the Northern Division of the Carnarvonshire Roads," but that there is no reliable evidence, either internal in his report, or external, notwithstanding the kindness and affection of his friends, that Mr. Haywood, of Bangor, is the fittest man in the Principality to instruct the rising generation in the deeply interesting subject of the blue veins of North Wales.

A question or two to Mr. Haywood and I shall have done with him. Perhaps he will inform you—for he is not going to "bandy words and personalities with Mr. Harvey"—where, in North Wales, can he point to an instance of so much work of every description done, for the money (about 13,000*l.*), in an entirely new quarry, and such a quantity of slate made, as in Llanfair? How much money has Mr. Haywood spent in Cwt-y-Bugail, and how much slate has he manufactured there? I am not going to "bandy words with" Mr. Haywood; but an inuendo is a malicious and cowardly thing, and he would not like to give its equivalent in any locality in which I reside, either in London or Wales. I will not trouble you with any more than an enumeration of the reports on the Llanfair Quarry, which have year by year appeared in the Journal, and refer your readers to those *reports*.

1863.—The report of Thomas Colliver, Esq., the lessee of the Bangor Slate Quarries.
The report of William Stirling, Esq., slate merchant, Stratford.
1864.—The report of Richard David, Esq., quarry proprietor, and quarry engineer and land surveyor, Carnarvon.
1865.—The report of Mr. John Roberts, the local manager of the Prince of Wales Slate Quarry. A second report from Mr. Colliver.
1866.—The report of Mr. Joseph Kellow, before given, all being strongly in favour of the quarry.

I now leave these gentlemen and Mr. Haywood face to face, to reconcile their differences. T. HARVEY.

33, *King-street, Cheapside, Dec.* 19.

THE LLANFAIR GREEN AND BLUE SLATE QUARRY.

SIR,—I have read the correspondence on this quarry in last week's *Mining Journal*, and, having inspected the quarry on two different occasions, I may, perhaps, be allowed to say a few words on the subject. I inspected the quarry, first, about eight years ago, when it was worked by its first proprietor, Mr. Richards; and again in May, 1865, for Mr. Southall, Birmingham—at least, my report went into his hands. On both these occasions my decided opinion, expressed in the plainest language, was that the quarry could never pay. Four years' working has proved this opinion to be correct. Hundreds have, and probably will be, ruined owing to the mercenary motives of unprincipled quarry speculators, and because the victims themselves will not listen to the voice of reason. Since inspecting Llanfair in 1865, I have inspected and surveyed scores of mines and quarries in England, Wales, and Scotland, yet I never inspected a more worthless property than this, and the desire to spend more money on such property is highly iniquitous. I confess myself much surprised at the assertion that the slate at Llanfair is the same as at Delabole. Knowing both these quarries, I must respectfully beg to dissent from this. In my "Guide to Quarry Investors," which I intend to publish soon, I hope to make it clear, from geological as well as natural facts, that quarries situated like Llanfair cannot be made profitable. I may add I do not know any of the parties concerned. SAMUEL JENKINS.

THE PROGRESS OF MINING—AS A SCIENCE, AND SOURCE OF COMMERCIAL WEALTH—No. XXIII.

SIR,—Amid the varied interests of mining there is one class of mines that recently appears to be treated as a doomed enterprise—I allude to the deep old mines of which Great Wheal Alfred, Crenver and Abraham, Wheal Busy, and others form the type. Great Wheal Vor had nearly been added to the list, for croakers had already made up their mind that all the money in the resuscitation of it was lost, when the splendid discovery at Wheal Metal changed the spirit of their dream, and Great Wheal Vor, instead of becoming the wreck of their prophesy, again entered the much-coveted Dividend List, and may now be quoted as a refutation of such foregone conclusions as we wish to deprecate. I was talking to a very clever miner last night (of course over a glass of whiskey toddy), as to the prospects of the great old mines of the county. He said, "I hold it to be a fact that if the great Gwennap Mines, the Consols United, St. Day, and the others were properly drained by great central shafts, properly placed for commanding two or three mines, and furnished with powerful engines, all these mines might be made to pay immense profits, and the populations, instead of being in misery, would be restored to comparative affluence—that is, the affluence of the working man." He said, "I think that one very large engine would be sufficient to drain Tresavean; the cost would not be more than 2000*l.* a month, while from the tribute ground now existing from 700 to 800 tons of copper ore might be raised—equal (say) to 40,000*l.* a year. I do not mean to say that the difference would be all profit, but that such a reasonable profit would be obtained as to leave a fair result for the capital."

If great districts of mines were treated in this comprehensive form, much of the poverty now so justly complained of in Cornwall would disappear. The fault of the present system seems to be that too many mines have been discovered—in other words, that the backs of the great lodes have been opened in too many places, and each treated as a separate and distinct mine, while, in fact, it was only a part of a great whole. In treating each mine as a separate work, engine-shafts have been run down upon the line of the lodes, having only regard to restricted limits, or to the run of one course of ore; while close to the boundary on the next grant other shafts, and works of the same character, have to be undertaken, everyone fearing to drain his neighbour's water, until it comes to pass that a great many straitened and inconvenient shafts, supplied with small engines, far too weak to accomplish any effectual drainage, have been sunk, and the mines crippled with cost, unhandy power, and underground works. Several small mines, worked by small engines, have thus been established, where one large mine, commanded by efficient power, only ought to have existed. Going back to Gwennap, if we could suppose a sufficient number of great engine-shafts were sunk at convenient distances, to combine undercuts by large levels, and unwater the great abandoned mines there, many hundreds of tons of ore could be sent to market monthly, if only from the tribute ground, and good profits be realised. While in the county recently, I noticed much of this sort of property, and it seemed demonstrated to my mind that it was only not paying because some great and simple plan was not followed, instead of complicated ones, that had grown up by a sort of haphazard beginning, without having any notion where the end would be. I would have everything planned *a priori*, as to distance and depth (say) engine-shafts 200 fathoms apart, with power calculated to go 300 fathoms deep.

I think the capital necessary to perform such work would not be near so much as what is now wasted in irregular operations. As an example, there was a 40-in. engine working at Grylls, and pumping with two 17-in. lifts side by side from the 40. It is well known that around and below this spot the lodes are filled with rich tin, and if the 40 had been an 80-in. cylinder instead, the shareholders would now be in the receipt of considerable profits. Possibly, if instead of the two excellent rotative engines, and the one drawing engine, the rotative engines situate on the western part of the mine, and the pumping engine on the eastern, one great pumping engine and suitable shaft had been placed on the centre of the mine, attended by one good rotative engine for reducing the tinstuff, the whole might have been done for less money, and the mine kept in a state of large profits for a number of years to come, and might have formed a pioneer that would have cleared up the doubt as to the western lodes bearing ore in depth, which I believe they will do quite equal to their eastern cousins. I do not despair of seeing a great range of mines, like the Neptunes, yet sunk down, under highly profitable results, to the depth of (say) 300 fms. If some such great schemes as these were undertaken, capitalists would not wait long for larger interests than they receive from any other branch of commerce, but prosperity would again visit mines deeper than any that have ever yet been wrought in Cornwall, and a mischievous notion that lodes become exhausted at arbitrary depths would be exploded for ever. M. F.

THE CALSTOCK DISTRICT.

SIR,—As mining in the Calstock district is now receiving attention by the investing public, probably it would afford information to many if someone who is acquainted with the various mines in the locality would furnish, with your kind permission, the Journal with a statistical account of the amount of copper ore yet returned, and at about what depth. As the mines of Devon and Cornwall, as a rule, owe their existence to being in, or their proximity to, granite, the Calstock district must be reckoned from the granite range of Gunnislake and Hingston Down, including the mines that are nearer the influence of this granite than any other. I think, Sir, it will be seen that the district has contributed largely enough to the return of copper ores to fairly entitle it to the most spirited mining operations, particularly as there is so much unwrought ground still remaining, and presenting such unmistakeable evidences of large deposits of ore.
LEGITIMATE MINER.

THE DARIEN CANAL—No. VII.

SIR,—Premising that the whole Isthmus is covered throughout with a dense primeval forest, extending from the summits of the highest mountains down to the very edge of the sea, and broken only by the courses of the rivers, which are very numerous, I shall divide the line from Caledonia Harbour to the mouth of the Lara into six parts, which, with the mean courses by compass, and the distances in English miles between the principal points, are as follows:—

1.—The line crosses a plain extending from the S.W. extremity of the Bight, in Caledonia Harbour, to the entrance of a valley, or pass, between Agia Mountain, on the S.E., and Sassardi Mountain, on the N.W.—2 miles S. by W. ¼ W. Caledonia *Harbour* must not be confounded with Caledonia *Bay*, for there is no pass through or across the Cordillera from the latter.

2.—Through the valley, 3½ miles, S.E. by S. ¼ S. On the way the line strikes upon the River Sucubti.

3.—Down the Sucubti to the site of the abandoned hamlet, 2¼ miles, S. ¾ E. Canoes can come up to the latter point, and even a couple miles above it, and can descend from thence to the Pacific *via* the Chuquanaqua and the Tuyra.

4.—From the site of Sucubti hamlet down the bed of the river to the confluence of the Asnati with it, seven miles W.S.W. In this stage the Napsati falls into the Sucubti, 2½ miles above the Asnati.

5.—From the Asnati mouth the line continues to follow the Sucubti down to its confluence with the Chuquanaqua, on the east bank of which it opens, 11½ miles W. by ¾ mile N.

6. From the west bank of the Chuquanaqua, opposite the Sucubti mouth, and below those of the Artuganti and La Paz, to the confluence of the Lara with the Savana, it traverses 15½ miles, S.W. by W. ¼ mile W.

The length of the line is 42 English miles, from which at least 3 may be deducted for the windings of the Sucubti, which would be cut across. It runs for 21½ miles along the bed of that river, the lower 12 of which are pretty direct, and would admit of being canalised, by means of dams and embankments, for a moderate outlay, leaving 27 miles for the length of canal required. The entire line of transit from sea to sea will then consist of—Canal, 27; canalised river, 12; navigation of the Savana, 16; and of the Tuyra, 3: in all, 58 English miles. This distance could be easily traversed in 24 hours, even making allowance for the time that would be occupied in the passage of locks.

The S.W. end of the Bight in Caledonia Harbour being in latitude 8° 53′ 45″ and longitude 77° 43′ 39″ and the mouth of the Lara being in latitude 8° 41′ 45″ and longitude 78° 7′, the distance between them in a direct line is 26 geographical, or 30⅛ English miles, and the course is S. 62° W. (S.W. by W. ½ W.) true, or S.W. ¾ W. by compass, allowing three-quarters of a point for the variation, which was 8° 50′ E. in 1854. The variation is increasing at the rate of, probably, a quarter of a minute each year, and may now be assumed to be 8° 53′ E.

As the tide of the Pacific rises 6¼ ft. at the bifurcation of the Lara (3¾ miles above its mouth), and that point is less than 28 English miles from Caledonia Harbour, the length of the canal would be lessened by two miles, by cutting into the river at its bifurcation, and dredging it from thence to the Savana.

The following are the latitudes and longitudes of the principal points:—

	Latitude N.	Longitude W.
Escocs Point	8° 51′ 22″	77° 38′ 30″
Golden Island, N.E. point	8 54 20	77 40 50
Fronton of Sassardi	8 58 4	77 45 0
San Fulgencio Point	8 53 37	77 42 15
S.W. end of the Bight in Caledonia Harbour, N.W. of San Fulgencio Point	8 53 45	77 43 30
Entrance of Valley	8 52 7	77 44 15
Sucubti hamlet (site of)	8 47 30	77 43 45
Asnati mouth	8 46 0	77 49 0
Sucubti mouth	8 48 30	77 57 45
Lara mouth	8 41 45	78 7 0
Savana mouth, W. Point	8 28 30	78 5 0
Boca Chica, Tuyramouth	8 28 45	78 8 0
Punta Brava	8 29 30	78 24 15
Garachiné Point	8 6 0	78 22 30

Punta Brava is 78 miles S.E. by E. ½ E. of Panama; and San Fulgencio Point is 135 miles E. by S. of Aspinwall or Colon, in Navy Bay, the Atlantic terminus of the Panama Railroad. The line is from 60 to 80 miles E. of the boundary line between the Isthmus of Darien and the Isthmus of Panama, which runs from the mouth of the Chepo, in the Gulf of Panama, to Mandinga or San Blas Bay, and along its shore to Cape San Blas, and corresponds nearly to the meridian of 79° west.—*Dublin.* E. CULLEN, M.D.

MINING IN AUSTRALIA—THE MOONTA MINE.

SIR,—Feeling certain that any communication affording information to the general public on the subject of mines will meet with a favourable reception at your hands, and ready publication in the *Mining Journal*, I send you in a tabular form a few particulars of an Australian copper mine, which, though one of the richest yet discovered, is comparatively little known in England.

The mine referred to, the Moonta, is situated in Yorke Peninsula, in this colony. The land is held by the proprietors of the mine under a mineral lease from the Colonial Government for 14 years (renewable for a like period on payment of a premium not exceeding 20*l.* per acre) at a yearly rental of 10*s.* per acre, and consists of 11 sections 80 acres each. The first discovery of surface indications of ore was made in May, 1861, and in June of the same year workings were commenced. At the commencement of the undertaking capital was borrowed to carry on the works, and not only have no calls been made, but the money borrowed has been repaid, and profits amounting to 125*l.* per share, or, on 3200 shares, to 400,000*l.* have been divided among the shareholders. Most of the ore is smelted at the Wallaroo Smelting Works, and the copper produced appears in the London and Indian markets as Wallaroo copper. The ore not smelted in the colony is shipped direct to Swansea. A SOUTH AUSTRALIAN.

Adelaide, South Australia, Oct. 26.

Extracts from the Half-yearly Reports of the Moonta Mine.

Date of report.	Ore raised.	Average percentage.	Total. Cost.	Total. Value.	Total. Profit.	Per ton. Cost.	Per ton. Value.	Per ton. Profit.	Dividends.
	Tons.		£.	£.	£.	£. s. d.	£. s. d.	£. s. d.	£.
Sept., 1862	4,865⅚	19	23,271	67,350	44,079	4 15 8	13 17 0	9 1 4	10
March, 1863	3,905	—	19,938	78,100	58,162	5 2 1	20 0 0	14 17 11	10
Sept., 1863	5,611	—	26,833	66,341	39,508	4 15 7	11 16 5	7 0 9	5
March, 1864	5,021	19	27,882	60,252	32,370	5 11 0	12 0 0	6 9 0	10
Sept., 1864	5,372	19	27,246	59,092	31,846	5 10 6	11 0 0	5 8 6	5
March, 1865	8,811	21	58,366	105,732	47,366	6 12 6	12 0 0	5 7 6	20
Sept., 1865	11,475	20	78,082	114,750	36,668	6 16 2	10 0 0	3 3 10	10
March, 1866	10,567	22	79,416	137,371	57,955	7 10 3	13 0 0	5 9 9	15
Sept., 1866	11,066	20⅛	66,900	121,726	54,826	6 0 10	11 0 0	4 19 2	15
March, 1867	10,844	19	76,081	119,240	43,159	7 4 0	11 0 0	3 19 8	15
Sept., 1867	12,115	19	75,855	121,150	45,295	6 5 2	10 0 0	3 14 9	10

Number of men employed:—Sept., 1862, 263; March, 1863, 311; Sept., 1863, 362; March, 1864, 416; Sept., 1864, 692; March, 1865, 964; Sept., 1865, 1075; March, 1866, 989; Sept., 1866, 954; March, 1867, 989; Sept., 1867, 882.

MINING IN AUSTRALASIA—MONTHLY SUMMARY.

YORKE PENINSULA.—A long time has elapsed since I last wrote to the *Mining Journal*, and I cannot say that I resume my pen under very auspicious circumstances. The low price of copper, combined with the general depression of trade, has brought mining to a much lower ebb than used to be the case when copper was 20*l.* a ton higher. There is, however, no real falling off in our great mines—I mean those of Moonta and Wallaroo; the Burra, of course, has seen its best days long since pass away. The old mine is, however, still being worked, through not to the extent, nor with the same results, as formerly. It is still the opinion of many persons that under different management the Burra might again resume its position as a dividend-paying mine. The prospect of the railway being extended to the mine is encouraging for its future operations. I have heard some talk of a falling off in the quantity of ore from the Moonta, but I do not believe there is anything more than a temporary diminution of the quantity raised. I hear, from sources likely to be well informed, that the mine is looking as well as ever. Perhaps, it pays the proprietors better to raise 200 or 300 tons a month less ore, with fewer hands, than to raise a larger quantity at a greater cost of labour. The Wallaroo Mine has lately been yielding at the rate of from 2500 to 3000 tons of ore per month. There are two other mines near the Moonta gradually rising into importance—I refer to the Paramatta and the Wheal Hughes. The former has paid expenses almost from the very commencement, and has now a surplus in hand; the latter, though not hitherto quite so fortunate, bids fair to rival the other. Ore of fine quality is being raised from both, and the lodes are large, and in very good country. The mines are in the closest proximity to each other, the same lode being worked in both, while the Wheal James appears to have struck a caunter lode, producing excellent ore. There are a few other mines which it is quite a pity to see idle, but which are stopped for want of capital to work them. Those are the class of mines which in many cases would offer profitable investments for English capital. If gentlemen in England, accustomed to mining ventures, had agents here on whom they could depend, they might frequently get hold of a good mine, at a low figure, after the first adventurers had exhausted their funds. In some cases it has been proposed to issue shares in certain mines in the English market for the purpose of raising capital to continue the workings. In a few instances I believe the investment might be safely made, and would be mutually beneficial. It is not for me at present to indicate the particular mines to which I refer, but your readers need find no difficulty in obtaining reliable information. Our new mineral regulations will probably have become law by the time this reaches you; and they are so much more liberal than any we have hitherto had in force, that they should give an impetus to mining adventures. Railway extension is exciting a good deal of attention with us at the present time. One of the most important projects—at least, as far as it interests your readers—is the construction of a line, for at least 200 miles northward, from Port Augusta to the neighbourhood of the Yudanamutana Mines. It is proposed that the Government shall offer certain facilities for constructing the line, and a guarantee of 5 per cent. on the cost, for a period of 30 years. A Bill authorising these things has as good as passed both Houses of Parliament, but it is thought to be scarcely liberal enough in some of its provisions. If the Government were likely to carry out strictly the provisions of the Act, in case of any laches on the part of the company making the railway, it would certainly be very arbitrary, but I do not suppose in practice it would be half as formidable as it appears in the provisions of the Bill. Such a railway would aid most materially in the profitable working of the Yudanamutana, Daly, Stanley, Welcome, Mount Rose, Blinman, and other rich mines in the North, most of which are now lying useless in consequence of the high rates of carriage by drays. Besides the ore, there would be a considerable traffic in wool, and some passenger traffic also. There is no doubt this colony offers a fair field for the employment of English capital in the formation of railways, which under careful management would pay from 6 to 12 per cent. The Kadina, Wallaroo, and Moonta lines, belonging to a private company, are paying 15 per cent. per annum, but they have a traffic of 8000 tons a month of ore, coal, and general merchandise.—J. B. A.

AUSTRALIAN MINES.

YUDANAMUTANA COPPER.—The news from the Blinman Mine this week is very good. A plentiful supply of fuel is being delivered at the works. Ten tons of copper were made last week from two furnaces, and they expect to make 15 tons this week. On Sept. 30 they sold 10 tons of copper, making the total quantity sold there during September 84 tons, besides 3 tons of ore, realising 581*l.* 5*s.* 2*d.* nett. The Port Augusta Railway Bill has passed the Lower House; the 5 per cent. guarantee is expected to be increased to 6 per cent. before it becomes law. Capt. Terrell has omitted to enclose his report for this month. This is to be regretted, as his letter speaks well of the mine.

WORTHING.—Oct. 24: The operations at the mine were going on much as usual. Legg's engine-shaft was down 83 fms., and the men were engaged cutting plat preparatory to driving to cut the lode. The 73 fm. level end is still hard, and the driving slow. More water is issuing from the 73 fm. level cross-cut west, and many small strings of copper running through the country in the same direction as the drivage. The driving of the 63 south was retarded owing to so many slides being met with; but is was thought that the lode had now been reached, having cut into a branch of quartz and ore, letting down a considerable quantity of water. Ore raised during the month 170 tons; smelted, 154 tons; regulus made, 32 tons. The manufacture of fine copper was progressing satisfactorily. The first 10 tons have been run out, and averaged 99 per cent.

GREAT NORTHERN COPPER.—Capt. Tonkin (Oct. 19) reports:—Nuccalena Mine: We have intersected another branch, composed of iron and quartz, with a portion of gossan. The strata are yet unsettled. I shall continue to drive south until I come to settled strata of country, and then drive on the branch or lode that carries the most copper. I am doing my best in pushing on the works.

ENGLISH AND AUSTRALIAN COPPER.—The quantity of coal at Kooringa was 131 tons, and at Port Adelaide 30 tons. There were four furnaces at work at Port Adelaide, and one refinery. As soon as a sufficiency of fuel had accumulated at Kooringa the furnaces would be re-lighted. Since last advices a shipment of 250 tons of copper had been made.

SCOTTISH AUSTRALIAN.—The sales of coal from Lambton Colliery for September amounted to 12,099 tons. The following is an extract from the letter of Mr. Young, assistant superintendent:—The progress of Lambton Colliery continues as satisfactory as can be expected, considering the season of the year, and we still do our fair share of the trade. The shipments for last month represent a very fair month's work. The quantity shipped for the portion of this month that has elapsed promises to show a still better result.

PORT PHILLIP AND COLONIAL GOLD.—The quantity of quartz crushed during the month of September was 7041 tons, yielding 4404 ozs. 16 dwts. of gold, or an average of 13 dwts. 12 grs. per ton. The receipts were 16,335*l.* 11*s.* 6*d.*; payments, 6149*l.* 18*s.* 6*d.*; profit, 10,185*l.* 18*s.*, which, adding the balance from last month, 14*l.* 8*s.* 6*d.*, makes 10,200*l.* 6*s.* 6*d.* The amount divided between the two companies was 8000*l.*, the Port Phillip Company's proportion of which was 5200*l.* The balance of the water supply debt, amounting to 2000*l.*, was written off, and a balance of 200*l.* 6*s.* 6*d.* carried to next month's (Oct.) account. The above return shows a considerable improvement over that of August, the yield of quartz alone being 11 dwts. 11 grs., against 7 dwts. 18 grs. the previous month. The large quantity of gold obtained from pyrites added very considerably to the return, bringing it much above the general average. The nett profit for the month being so very satisfactory, I considered it better, this being the close of the year, to write off the balance standing against the water supply account, amounting to 2000*l.* The company is now entirely free from debt. The following is the return for the first three weeks of Oct.:—Quartz crushed, 3703 tons, yielding (say) 1576 ozs. of gold, or an average per ton of 9 dwts. Remittances, 5000*l.* on dividend account, and 335*l.* 15*s.* 7*d.* on stores, &c., accounts.

CADIANGULLONG COPPER.—During the month there were raised from the mine 44¼ tons of ore, averaging 12 per cent. for copper, estimated to yield 5⅓ tons of fine copper. There have been further shipped to London, per Brucklay Castle, 8 tons of fine copper; there were at the works 13 tons more almost ready, and in ores, slags, and other metals 10½ tons. Copper ore on hand 50 tons; wood, 486 tons.

FORTUNE COPPER.—Capt. Penberthy (Aug. 31) reports: The different points of operation throughout the mine are producing an average quantity of ore per fathom. We have dressed this month 20 tons of copper ore, from 16 to 18 per cent.; 70 tons of lead ore, from 75 to 80 per cent.; and forwarded to port 101 tons. In store, awaiting shipment, 411 tons of lead ore and 83 tons of copper ore.

FOREIGN MINES.

JAVALI.—The monthly report of the manager of this property, dated Oct. 31, and additional advices down to Nov. 9, have come to hand. Messrs. Tate and Blake and the two carpenters had arrived out, and preparations were being made for the reception of the stamp machinery from California. Although every trace of sickness had disappeared in Chontales, the scarcity of native labour in that district still continued in unabated degree, and the manager was therefore unable to send more than 105 ozs. of gold, principally obtained from ore taken out in driving the tunnels, there not being a sufficient number of hands to bring down some of the rich stuff accumulated at the mouth of the Socorro. Work had just been resumed in Seemann shaft, a few yards only being now required to effect a junction's with the Socorro workings, and then all carrying of ore on men's backs can be entirely done away with.

CAPULA.—Capt. Paull, Nov. 7: Since my last of the 26th ult. we have sent to San Cayetano hacienda 115 cargas of good ley ore, which I trust will turn out well. I intend sending there also some smelting ore as soon as we have money to resume the works at the mine to smelt with the revoltura slag, &c., that was left at San Pascual. The silver from the lead, 125 marcs 5 ozs., was sent to Mexico on Tuesday last; I expect it contains a good ley of gold. The only work we are doing at the mine at present is driving south from San Enrique level to meet the south wall. We have some peones repairing the road and a mason repairing the walls of the house against Capt. George's arrival.

LUSITANIAN.—Dec. 10: Palhal Mine—Basto's Lode: The lode in Taylor's engine-shaft, below the 110, is now worth 3 tons of ore per fathom. In Rives's shaft, below the 90, the lode is 1 ft. wide, composed of flookan. The lode in the 110, east of Taylor's shaft, is worth 4 tons of ore per fathom. In the 110, west of Taylor's, the lode produces 1 ton per fathom. The rise above the 110, against winze No. 64, is holed. The lode in the 100, west of Taylor's, is 1½ ft. wide, composed of flookan and quartz. The 100, east of Taylor's, is 1 ft. wide, composed of flookan, intermixed with country. The lode in the 90, east of Rives's shaft, is 1½ ft. wide, formed of quartz, with copper ore, worth 1½ ton per fm. The lode in the 70, east of Rives's shaft, is large, containing stones of ore. The 38, west of Perez' shaft, contains stones of ore; the lode is small. The lode in the 70, west of slide, is 1 ft. wide, composed of quartz. The lode in the 18, west of Perez' shaft, is small, composed of flookan. In the adit, west of Perez' shaft, the lode contains stones of ore.—Levels on Caunter Lode: The 90, east of slide, is unproductive. The 80, east of slide, yields ½ ton of ore per fathom. The 100, west of Basto's, being poor, is suspended.—Level on Ponte Lode: The lode in the 28, east of slide lode, is small, composed of quartz, impregnated with lead. The south part of the lode, which is apparently the best of it, is now being stripped down, but it proves to be valueless.—Level on Great Caunter Lode: The lode in the 60, west of Oak shaft, is 8 in. wide, composed of flookan.—Cross-cuts: There is no change in either of the three cross-cuts since last report.—Winzes: The No. 64 winze, below the 100, west of Taylor's, is holed. Winze No. 67, below the 100, east of Taylor's, and winze No. 65, below the 50, west of Taylor's, produce 1 ton and ½ ton of ore per fathom, respectively.—Stopes on Basto's Lode: Above the 18, west of Fonsaco's winze, the lode is worth 1 ton of ore per fm. Above the 28, east and west of winze No. 58, the lode is worth 1 ton of ore per fathom. Above the 80, east of Domingo's winze, the lode is worth 1 ton of ore per fathom. Above the 80, west of Domingo's winze, the lode is worth 1¼ ton of ore per fm. Above the 80, east of Taylor's, the lode is worth ½ ton of ore per fathom. Above the 50, west of Ernesto's winze, the lode is worth 1 ton of ore per fm. Below the 60, east of Rives's shaft, the lode is worth ¼ ton of ore per fathom. Below the 80, east of winze No. 61, the lode is worth 1 ton of ore per fathom. Above the 90, west of Taylor's, the lode is worth 1 ton of ore per fathom. Above the 90, east of winze No. 61, the lode is worth 1¼ ton of ore per fathom. Above the 100, east of Taylor's, the lode is worth 1 ton of ore per fathom. Above the 100, east and west of winze No. 60, the lode is worth ¾ ton of ore per fathom. Above the 28, west of Taylor's, the lode is worth 1¼ ton of ore per fathom.—Stopes on Caunter Lode: Below the 70, east of winze No. 59, the lode is worth 1 ton of ore per fathom. Above the 70, east of Tavara's winze, the lode is worth 1½ ton of ore per fathom. Above the 50, west of Machado's, the lode is worth ¾ ton of ore per fathom.—Stope on Slide Lode: Below the 60, east of winze No. 66, the lode

is worth ¾ ton of ore per fathom.—Stopes on Mill Lode: Above the 38, east and west of Taylor's, the lode is worth ⅓ ton of ore per fathom. Below the 38, east of Taylor's, the lode is worth ⅓ ton of ore per fathom.—Stope on Great Caunter Lode: Above the 50, east of Laurance's winze, the lode is worth ⅓ ton of ore per fathom.—Carvalhal Mine: The lode in the 40, east of incline shaft, is 1½ ft. wide, worth ⅔ ton of ore per fathom. In the 40, west of incline shaft, the lode is 1 ft. wide, composed of quartz. The lode in the 30, east of incline shaft, is 1½ ft. wide, composed of quartz and stones of lead. The 30, west of incline shaft, is worth for lead and blende 1 ton per fathom. The 20, east of incline shaft, produces ¾ ton of ore per fathom. In the 10 east the lode is 3 ft. wide, composed of quartz, spotted with lead. The lode in the 10, west of rise, is 6 ft. wide, composed of quartz and lead, of the latter it is worth ½ ton per fathom. In the rise above the 30, east of incline shaft the lode is 2 ft. wide, composed of quartz.—Stopes on Great Lode: Above the 20, east of incline shaft, the lode is worth 1½ ton per fathom. The ore ground being worked out, the stope above the 30, east of winze No. 3, is suspended.—Figueiredo Mine: In the 40 metre level, east of Henty shaft, we are unable to say anything about the lode, not being able yet to get to see it.

ALAMILLOS.—Dec. 7: The lode in the third level, east of Magdalena shaft, is disarranged, in consequence of the slide being in the back of the end. In the third level, east of San Enrique shaft, the lode is strong, and spotted with lead. The fourth level, east of Magdalena shaft, produces 2 tons of ore per fathom. This lode is still opening very good tribute ground, although not nearly so rich as it was. The lode in the fourth level, west of Magdalena shaft, yields 2 tons of ore per fathom. The lode in this end has also failed during the last few days, but we expect it will improve shortly. In the fourth level, east of Taylor's engine-shaft, the lode is disarranged, and the ground is at present very easy for driving through. The lode in the fourth level, west of San Andriano shaft, is very regular, and contains spots of lead. The third level, west of San Andriano shaft, and the third level, east of San Jago shaft, each produce ½ ton of ore per fathom. These ends will be holed in a few days, making the level good continuous to San Yago shaft. The lode when free of the slide is moderately productive. The lode in the third level, east of Crosby's shaft, yields ½ ton per fathom; this lode is disordered into sundry small branches. The second level, west of Crosby's cross-cut, produces 1 ton per fathom. This is opening a run of moderately productive tribute ground.—Shafts and Winzes: Taylor's engine-shaft, sinking below the fourth level, produces ½ ton of ore per fathom. The men are making good progress with this sink, and we hope to complete it to the fifth level this month. Bendu's winze, below the third level, which produces 1½ ton of ore per fathom, is going down in a promising and productive lode. Fernandez' winze, below the third level, yields 1 ton of ore per fathom. The lode sunk through last month was very productive, but it is not so good at present. The house for the bull engine is completed, and the engine will be erected as fast as possible. Our machinery is in very good working order. The tribute department produced a very good quantity of ore in the past month, and the stopes are looking well for December, enabling us to estimate the raisings at 230 tons.

LINARES.—Dec. 7: West of Engine-shaft—South Lode: The lode in the 110, west of engine-shaft, produces 1½ ton of lead ore per fathom. In the 75, west of Warne's shaft, the lode yields 1½ ton of ore per fathom. The water being now kept under by the big engine, the level will be driven as fast as possible. The lode in the 30, east of San Francsco shaft, on the north part, is split into branches, the north one being compact and productive, producing 1 ton of ore per fathom.—East of Engine-shaft: The lode in the 95, east of Taylor's cross-cut, is very wide, producing 1¼ ton per fathom.—North Lode: The 95, east of Taylor's shaft, has opened ore ground in the past month, but has changed unfavourably lately. The lode in the 95, east of No. 154 winze, is very wide, yielding ½ ton of ore per fathom.—Shafts: At Warne's engine-shaft, below the 75, the pitwork is working remarkably well, and we hope now to make good progress in sinking towards an 85 fathom level. The tribute department yielded the estimated quantity of ore during the past month, and the stopes are, on the whole, looking much as usual. The machinery is in good working condition, and the surface operations are going on very regularly. We estimate the raisings for December at 270 tons.

— Dec. 11: At Quinientos Mine an 8½-in. plunger-lift has been fixed at the 22 fathom level, and the shaft divided and cased to that depth; and in a few days the sinking left will be in its place, when the deepening of the shaft to a 35 fathom level will be resumed and pushed on vigorously. The lode is worth 1 ton per fathom in the shaft, with indications of improvement.

FORTUNA.—Dec. 7: Canada Incosa: In the 100, west of O'Shea's shaft, the ground is hard for driving through. The lode in the 90, west of Judd's shaft, which produces 1 ton of lead per fathom, is getting smaller, and the granite is harder. In the 80, west of Judd's shaft, the lode is small, with good stones of ore in the back of the end. The lode in the 70, east of Carro's shaft, produces 1 ton per fm.; this lode has improved during the past week. In the 55, east of Carro's shaft, the lode is small and unproductive.—South Lode: The lode in the 50, east and west of Gil's winze is large, and of a kindly appearance, producing ½ ton of lead ore per fm. In the 40, west of San Pedro shaft, the lode produces ¾ ton per fm. This is still opening tribute ground, but is not so productive as it has been. The 30, west of San Pedro shaft, which produced ½ ton per fathom, is suspended for the present.—Los Salidos Mine: There is no alteration in the appearance of the elvan course in the 100, west of Morris's engine-shaft. The 90, west of ditto, is again in a hard bar of unproductive ground. The 75, west of Buenos Amigos, produces 1½ ton per fathom; this lode is still good in the bottom of the end, but has greatly failed in the upper part. The lode in the 65, west of San Carlos, is very compact and solid, producing 1½ ton per fathom. The lode in the 100, east of Morris's engine-shaft, which yields ½ ton per fathom, has a very kindly appearance in the back of the end, but it is poor in the bottom. The 90 fathom level, east of Cox's shaft, is opening a splendid piece of ground; the lode is compact and firm, producing 3 tons of ore per fathom. In the 75, east of Cox's shaft, the lode is small, and the ground hard. The lode in the 65, east of San Miguel shaft, continues poor; we fear we have reached the extremity of ore ground in this direction. The men are put to cross-cut north, to prove a part of the lode standing there.—Shafts and Winzes: The lode in San Pablo shaft, sinking below the 65 fathom level, produces 1½ ton per fathom. The men are getting on well with this sink, and the lode is turning out satisfactorily.—Buenos Amigos: The new engine-shaft yields 2½ tons of ore per fathom; this shaft is being sunk by an excellent pare of men, who are making good progress; the ore is of very good quality. A very fair average weekly return was maintained during the past month, and the stopes throughout the mine have not undergone any change of importance. The machinery is in excellent working order, and the operations at surface are proceeding very regularly. We estimate the returns for December at 400 tons.

[For remainder of Foreign Mines see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

Mines and ironworks at Decazeville, in the Aveyron, offered at 80,000*l.*, have been disposed of to the Orleans Railway Company, for a sum of 115,200*l.* The Campagnac Mines Company, whose concession is situated in the same basin, bid for this Decazeville property to the extent of 108,000*l.* The beds forming the Decazeville Collieries are of considerable power and importance, and it is expected that their working will now acquire a considerable development, although it will be limited by the wants of the Orleans Company, the statutes of which do not permit it to trade in coal. In the Haute-Marne, rolled coke-made iron easily obtains 7*l.* 4*s.*; mixed ditto, 8*l.* 4*s.* to 8*l.* 8*s.*; and charcoal-made ditto, 9*l.* per ton. Pig is held at 4*l.* 5*s.* 10*d.* to 4*l.* 6*s.* 8*d.* per ton—a quotation which can, however, be scarcely maintained, if, as is said to be the case, the Meurthe offers its pig at 4*l.* 4*s.* per ton, free at St. Dizier. The ironstone bearings of the Dordogne produced in 1866 29,800 tons, or one-third more than in the preceding year. The production of the ironworks of the department, which in 1864 was 13,617 tons, declined in 1865 to 13,197 tons, while in 1866 it further receded to 12,357 tons. Steel does not figure among the metallurgical products of Dordogne, although the manganeliferous products which are found at several points of the department would allow a pig very well adapted to the fabrication of steel to be produced. With reference to a dispute as to the payment of Parisian octroi duties, a committee of owners of works has issued a manifesto, in which it states that it objects to pay octroi duties, except on manufactured objects delivered to local consumption, and which may be subject to the tariff. In the Franche-Comté the forges which work the pig of the district, and of the South, show a fair amount of activity; but it is not the same with the blast-furnaces, which are suffering severely from depression, as we have recently had occasion to show. Meetings are announced as follows:—Coal Agglomerates Company, Dec. 24, at Paris; Gennamari and Ingurtosu Argentiferous Lead Mines Company (Island of Sardinia), Dec. 27, at Paris; Colliery and Metallurgical Company of the Asturias, Dec. 30, at Paris; and Crusino Mines Company, Jan. 27, 1868, at Paris.

As regards Belgian metallurgy, it may be noted that the price at which a contract for rails for the Belgian State Railways was recently taken by the house of De Dorlodot, of Acoz, shows a reduction of 1*l.* 4*s.* per ton as compared with a corresponding contract let in 1866. English firms have not disappeared altogether from the competitions for plant, &c., required for the Belgian State lines. Thus, in tenders for two lots, comprising 300 wheels each for carriages and trucks, we find that MM. Nicaise and Delcuwe, of La Louvière, tendered for the two lots at 1733*l.* each, while Messrs. C. Cammell and Co. (Limited), of Sheffield, represented by MM. Desmedt and Co., of Molenbeek St. Jean, sent in a tender for the two lots at 1856*l.* each. Messrs. John Brown and Co. (Limited), of Sheffield, obtained a contract for 600 iron piston buffers, for 10-tons goods trucks, at 515*l.* 10*s.* 5*d.*; the next tender being that of MM. Bassilière and Duvieusart, of Molenbeek St. Jean, at 532*l.* 6*s.* 5*d.* A tender for this lot was also delivered by Messrs. Taylor Brothers, of Paris, at 648*l.* In connection with the contract for rails recently given out for the Belgian State lines we find the allowance to be made for weight is to be only 2 per cent., more or less, while last year the corresponding allowance was at the rate of 4 per cent. The regulations as to testing are also more severe this year, and finally the guarantee required, which in 1866 was only three years, is now extended to four years. The greater rigour displayed this year by the *cahier des charges*, as compared with 1866, renders, of course, the low prices accepted all the more remarkable and striking; and, under all the circumstances, it is not surprising that the adjudication should have provoked a good deal of discussion and comment. The Luxembourg Mines and Sarrebruck Forges Company will pay, Dec. 31, interest and dividend for the exercise 1866-7, or 4*l.* per share. Meetings are announced as follows:—Cologne Musen Mines Company, Dec. 21, at Cologne; Central Belgian Rolling Mills Company, Dec. 26, at La Louvière; Central Company for the Construction of Public Works and Railway Plant, Dec. 27, at Brussels; Bois Collieries Company, Dec. 30, at Quaregnon; and Haine St. Pierre Forges, Ironworks, and Foundries Company, Jan. 9, 1868, at Brussels.

At Havre various lots of Chilian copper in bars have been dealt in, at 72*l.* per ton, Paris conditions, and the tone of the market renders probable the maintenance of this rate. At Paris the market for copper has been firm, Chilian making 72*l.* to 72*l.* 10*s.*; Corocoro mineral, 75*l.*; English in plates, 78*l.*; Lake Superior, 88*l.* The tone of the Marseilles market is better, and prices have shown a tendency to firmness, Toka making 74*l.*; Spanish, 72*l.*; refined Chilian and Peruvian, 80*l.*; rolled red copper for sheathing, 88*l.*; yellow ditto, 82*l.*; old red copper from the Levant, 64*l.* per ton. There is no particular fact to mention as regards the state of the German copper markets. At Hamburg the article maintains former rates, with, however, but little business doing. A slight reaction has appeared in the tin markets at Amsterdam and Rotterdam. Banca remains nominally at 54¼ fls., after a sale of 3000 ingots at 54 fls. to 54¼ fls.; 900 ingots of Billiton have also been run off at 53 fls. to 53¼ fls. Notwithstanding this movement, opinion remains favourable to the article, in presence especially of the inconsiderable stock now held by the Dutch Society of Commerce. The reports from Paris and Marseilles are tolerably satisfactory. On the first of these two markets the article maintains itself at former rates, Banca making 97*l.*, Straits 96*l.*, and English 95*l.* per ton. At Marseilles prices have displayed an upward tendency, and Banca has maintained itself firmly at 98*l.* per ton. Without giving rise to an exceptionally active current of affairs, the tone of the article has been good on the German markets. The lead markets have not revived, but at some points a less feeble tendency is apparent. On the Paris market rough French and Spanish are quoted at 19*l.* 12*s.* to 20*l.* per ton respectively. At Marseilles lead in saumons, first fusion, has made 18*l.* 8*s.*; ditto, second fusion, 18*l.* 4*s.*; in shot, 19*l.* 16*s.*; and rolled and in pipes, 21*l.* per ton. At Rotterdam the article has been very firm, and has found a regular outlet at 11⅛ fls. to 11¼ fls. for Stolberg, Eschweiler, and German of various marks. Soft German lead has been firmly sustained at Hamburg. There is but little stock on hand. There has not been much demand for zinc at Hamburg. The Breslau market has been quiet, but holders have maintained, nevertheless, a firm tone. At Paris zinc has been in moderate demand. Rough Silesian has been quoted at 22*l.*, and zinc from other sources at 21*l.* 4*s.* per ton.

At the annual meeting of the Santander Mines Company, the report was read by M. Berniere, the manager. It indicated a certain slackening in the company's affairs, which was attributed to the general state of commerce, and not to the condition of the company in particular. The exercise produced a nett profit of 12,202*l.*, admitting of the distribution of a dividend of 1*l.* 0*s.* 2*d.* per share; of this dividend 12*s.* 2*d.* has been paid this week, while the balance of 8*s.* per share will be paid June 15, 1868. MM. Lavallée, Béchel, and Du Roselle were re-elected directors. The Creuzot Works Company has authorised the distribution of a dividend of 2*l.* per share. The contract price of 80 locomotives, which the Creusot Works are about to supply to the Orel and Witebsk Railway is, 2512*l.* per locomotive, each engine weighing on an average 29½ tons. The price includes a six-wheeled tender, weighing 14 tons. Allowing 512*l.* for the tender, the price of each locomotive would be 2000*l.*, including delivery at Riga. The locomotives are to be paid for in money, but the Creusot Company undertakes to take up obligations guaranteed by the Russian Government to an amount equal to that represented by the contract. A contract for 25,000 tons of rails is expected to be shortly given out for the Poti and Tiflis Railway, a concern recently conceded to a French company, presided over by the Vicomte de Laguerronnière. After the order for these rails has been given out it is expected that other contracts will follow for 60 locomotives and 800 carriages. It will probably be necessary to accept payment—at any rate, partially—in obligations. These obligations may be expected to present, however, a more solid value than those issued by Spanish or Italian railway companies, as they will probably bear the guarantee of the Russian Government.

Chilian copper has remained quiet at Havre, but has shown, if anything, a little more activity. A lot of 25 tons, disposable in bars, has changed hands at 70*l.* 10*s.* per ton, Paris conditions; and more recently 115 tons have been dealt in at 70*l.* 16*s.* to 70*l.* 18*s.* per ton. Paris quotations also indicate somewhat more firmness, English, in plates, making 78*l.*; Lake Superior, 88*l.*; Chilian, 71*l.* to 71*l.* 6*s.*; and Corocoro mineral, 75*l.* per ton. Marseilles advices offer little interest, scarcely any sales having been effected. On the Hamburg market the article has been little sought after. On the other German markets also transactions have not been very extensive, and there have been no sensible variations in prices. On the Amsterdam and Rotterdam markets Banca tin has ranged between 54¼ fls. and 54¾ fls.; 2800 blocks have been disposed of at the former prices. Billiton attracts attention, and various lots have been taken off at 53 fls., 53¼ fls., and 53½ fls. The annexed table shows the deliveries and stock of Banca tin during the last three years on the Dutch market:—

	1865.	1866.	1867.
Deliveries from Jan. 1 to Nov. 30 ..Blocks	126,152	177,855	112,708
Stock on schedules, Nov. 30	109,459	140,109	158,909
Unsold stock of Society of Commerce, Nov. 30	90,300	60,624	23,976

The tone of the article has been good on the Paris market, Banca having been firm at 97*l.*, Straits at 96*l.*, and English at 95*l.* per ton. The various German markets have displayed an upward tendency. At Rotterdam the various qualities of lead are quoted uniformly at 11¼ fls. On the German markets the article is maintained at former rates; the disposeable stock of soft German lead on hand at Hamburg is stated to be small. The Paris lead market has been quiet, rough French making 19*l.* 12*s.*, and Spanish 19*l.* 16*s.* per ton. Zinc has displayed a downward tendency on the Hamburg market. At Breslau the market is completely inactive, and a certain hesitation prevails among holders. At Paris the demand shows little animation; rough Silesian is feebly supported at 22*l.*, and zinc from other sources has made 21*l.* 12*s.* per ton.

A FREE LABOUR SOCIETY.

Most people seem now to be convinced that at the present moment a smouldering fire of antagonism, fanned by folly and selfishness, exists between capital and labour, which is not the growth either of yesterday or to-day; and that there is a good deal of danger in it. It is a kind of sporadic disease, which, appearing and disappearing here to-day, to-morrow crops up somewhere else, whence it is not, perhaps, so easily dislodged; but it is always impending, and produces a general sensation of uneasiness and distrust. High prices for food in one place, low wages for labour in another: the public crying out against the butchers and bakers, the bakers and butchers retorting on the public; many hands out of work; rates heavy, and likely to be heavier; our poor starving without the workhouse, our paupers starving and ill-treated within—it is not a pleasant state of things to contemplate. Strikes are now less numerous than they were, perhaps because two of the most formidable—those of the London tailors and the North Eastern Railway drivers and firemen—were speedily and thoroughly broken up; but nevertheless there remains a spirit of moody discontent, which threatens mischief to trade and industry alike. Now, "for every evil under the sun there is a cure or there is none." For this state of things the remedy lies in our own hands, subject only to the amount of knowledge we have on the subject, and the degree of wisdom with which we apply it in practice. It is indeed true that we rarely move until we are driven; but as a sensible people we ought long since to have devised a comprehensive scheme, analogous to the French *conseils des prud'hommes*, adapted to bring into greater harmony the relations between the employers and employed. Such a scheme should employ no artificial, and therefore short-lived expedients, to regulate the labour market, or it cannot have a healthy and permanent success. One great aim should be to develope the use of the rail and telegraph in behalf of labour, in the same energetic way in which it has long been employed in forwarding the interests of trade. If corn or mutton, or any other commodity, is a drug in the market at certain points, and the tradesman, learning the fact by telegram, forthwith dispatches orders to purchase at that price and forward to him, he sells again at a lower rate than his competitors, and thereby prices tend to equalise at both ends; and there is no reason in the world why a similar operation should not be carried on with regard to labour.

The Trade Commission is at present sitting almost daily, and the moment seems opportune to discuss any proposed remedy for the state of things revealed by its labours. As the recently established Free Labour Registration Society is the first that has appeared at all promising to supply what is much called for, it may be worth while to enquire into the constitution and working of it, so as to enable the public to judge how far it can or is likely to be of permanent value. The objects aimed at are stated to be—first, to obtain employment for those who want it, and hands for employers; secondly, the free discussion of all questions affecting capital and labour; thirdly, the peaceful settlement of such questions by arbitration; fourthly, the protection of the interests of the members by strictly constitutional means. It is, in short, designed as a rallying point for non-unionists and employers. There is also a sick fund and benefit society connected with it, but each of them is separate and optional, so that a man can register himself either to obtain employment or to procure labour, or he can insure himself against sickness and death, as he sees fit. Members are registered gratis, and a fee of half a day's wages is charged when a situation is obtained through the agency of the society. Employers are members at the rate of 1*l.* annually for employers of less than 100 hands, and of 2*l.* for those who employ more. The general committee of management is composed of noblemen and gentlemen and an equal number of working men; five forms a quorum. The sick fund is very judiciously placed under the sole management of a sub-committee of working men, who report monthly to the central committee. The scale of payments has been determined by properly qualified authorities, and the rules of the benefit society have been examined and are attested by Mr. Tidd Pratt. Working men are made members by subscribing 1*s.* annually, for which they are provided with a card of membership. All this is well; and we are informed that the society has already provided many hundreds of men with employment at good wages, and through its agency four impending strikes have been prevented or arranged. Some thousands of working men have registered themselves, and numbers are daily repairing to the society's offices for the purpose. By co-operating with the society, the working man places himself under no patronage and accepts no charity. It is simply a system of insurance, like any other. For 1*s.* per annum he insures himself, as far as possible, from being out of work; by paying from 3*d.* to 6*d.* weekly if he is young, or from 6*d.* to 1*s.* if he is over 50, he is entitled to a sick allowance of from 10*s.* to 1*l.* per week; and he thus reduces to a minimum the two chief evils incidental to his calling. He can further lay before the society any gross act of injustice on the part of his employer, when, if the committee think it a fit case for arbitration, it will be so dealt with under Lord St. Leonards' Act. Any member refusing to abide by such arbitration loses his membership; and in all disputes between employers and servants an equal number only of the representatives of each class are to vote, and such votes are to be taken by ballot. Under these regulations we are not surprised that workmen should register themselves, but when we examine the attitude of employers, either in trade or otherwise, we find a decided contrast. Though the society is meant to be self-supporting, considerable preliminary expenses have been incurred, and some few noblemen and gentlemen have subscribed sums averaging 5*l.* each. If the scheme is a useless folly, this is too much; but if they consider it a wise and practical measure, it seems too little. It may be a symptom of the nervousness and timidity which, according to the *Saturday Review*, has fallen with such paralysing effect on the upper classes, but at any rate the mass of our territorial and county proprietors are, as a rule, nowhere in the movement.

We might reasonably expect to have seen the large employers of labour fully represented, not only as members, but as subscribers; but such is not the case. Where are the names of the fashionable tailors whose outcries were so loud this year, and whose losses were stated to be so large owing to the strike? Conspicuous by their absence. The railway companies have not joined the movement, and Sheffield contributes only one name. This may be owing to the cowed and demoralised mental state of the Sheffield magnates, of which we have had such numerous proofs, or it may be due to that curious policy of niggardliness which induces a man to postpone insuring his own shop till his neighbour's house is on fire. Yet if these gentlemen were to calculate how much a strike costs, and, more than this, how much the fear of a strike costs, would they measure it by hundreds or by thousands? To wait until a strike is imminent, and then to send a guinea with a hurried request for hands from the society, would not be a satisfactory way of dealing, and it is one which the committee ought to discourage if it is attempted. If the scheme is properly supported and worked it will undoubtedly do on a large scale and for all divisions of labour what Mr. Girdlestone did in a small way for the Dorsetshire agricultural servants. It will, however, be important that the subscriptions and charges due from the workmen and servants who obtain employment through the agency of the company should in all cases be paid in full, or the society will degenerate into a charitable association, the effect of which cannot be otherwise than demoralising to all concerned.—*Pall Mall Gazette.*

THE SILVER DEPOSITS OF LAKE SUPERIOR.

The discovery of veins of native silver, of immense value, in the vicinity of Fort William, on the Canadian shore of Lake Superior, has caused a revival of the interest felt in the mineral riches of Isle Royale. Mr. John H. Blake, of Boston, U.S., writes that about twenty years ago he went as pioneer to Isle Royale with a large party of Dutchmen, and settled in the then wilderness at Rock Harbour. He saw enough of the island during the year he was there to become convinced of the great abundance of copper it must at some time afford, and that in point of mineral wealth it was in no way inferior to the southern shore of the lake. The company he represented, and was part owner in, was the Isle Royale Company, and the lands were secured by one of their associates. The selection of lands was first made by advice of Prof. John Lock, of Cincinnati, and the sections on Isle Royal were chosen in preference to sections on the southern shore, which were at that time also offered for sale by the United States Government. No doubt existed in the minds of any of these purchasers as to the great value of the mineral veins on the island when the purchases were made, and the opinions entertained by them were confirmed by the explorations made during the year he was there.

The only reason that mining was not pushed forward with vigour was that the owners could not command sufficient capital to insure success. His own opinion was that extensive mining operations would at that time be premature, as the lands had not been cleared. Transportation was difficult, there being then few vessels on the Lake, and no canal at the rapids of Sault St. Marie; and provisions enormously expensive. It is true that mining had been little developed in the Lake Superior region at that time, but this is not the reason that the veins on Isle Royale were not extensively worked. The climate of Isle Royale is one of the most wholesome in the world, and the land is very productive, the clear atmosphere and heat of summer making up for the shortness of the season—the growth of the roots and seeds reminded him of the vegetation of a tropical climate. The island is capable of supporting a large population; the land is rich; the harbours excellent, and the geological formation of a nature that will admit of shafts being sunk to a very great depth without great expense for water-charges. The lake abounds with most excellent fish.

While Mr. Blake was prospecting there he discovered some fine specimens of silver on the southerly shore of Rock Harbour, and was shown by Mr. Robertson, a Scotchman, who had been prospecting on the north shore of the lake, near Fort William, some of the most promising specimens of native silver he had ever seen. He reported it as abundant, and when Mr. Blake saw him he was on his way to Scotland, to raise funds for opening a mine. Copper occurs abundantly in a bed of epidote on the south shore of the island, at a place to which he gave the name of Epidote, and at a place he named Datholite the most brilliant specimens he had ever seen occurring in datholite—they were more brilliant than native gold. If a large body of emigrants could be induced to combine their resources and locate upon Isle Royale, they would benefit themselves, as well as assist to develope the mineral wealth. There is an abundance of rich farming land, and the soil, without compost, will yield large crops for many years. The island is well watered, and has good pasturage. The market for all their products will be at Ontonagon, on the south shore of the lake, and the neighbouring silver mines at Fort William.

The Fort William veins already discovered to carry silver or silver ore are but two in number; several veins of lead, however, have been opened, claimed to be rich in silver. The two silver veins are about four miles to the east of Fort William—one on Currant River, and the other one mile further east. This was the vein in which silver was first discovered, and is now known as the M'Intyre vein—Herrick's location. The vein is about 18 ft. wide, and its course east and west. As far as examined, it is remarkably rich in the precious metal, the vein rock itself being very rich in fine silver, and, as copper miners would say, "horns" of silver protruding from the veins in many places where it has been exposed. Besides the native silver, the vein carries quite a large percentage of the sulphuret of silver, lead, and copper ore. A small force is now working, but they are merely gouging out the silver wherever it is exposed on the surface. The specimens obtained this season by Messrs. Harris, Meads, Spence, and others fully confirm the favourable opinions expressed.

The other vein mentioned is known as the Withers vein, and is situated on Currant River, about three miles back from Thunder Bay. Here they have commenced regular mining operations, under the superintendence of Mr. Richard Moyle, long and favourably known in the Lake district. The vein is 17 ft. wide, course east and west. Two shafts have been commenced, about 250 ft. apart, and are now down 30 ft. and 35 ft., and both producing considerable native silver and silver ore. The west shaft, which on the start carried no native silver, is now considered the best. Large tracts of land have been explored for several miles to the east and west of these locations, which prove by the outcropping of the veins that they are continuous, regular, and well defined. Undoubtedly, further developments will be made another season, or as soon as the Government of the dominion of Canada come to some decision in reference to the sale of the lands in the district. Should the present prospects continue, there can be but little doubt that, with a liberal policy by the Government towards explorers and speculators, the whole country, which is now a wilderness, will soon be bought up and settled, and add to the wealth and prosperity of the dominion.

The Canadians have made a commencement to open a highway to that far off, but rich and fertile, section of country. The Northern Transportation Company, with the assistance of the Government, have undertaken to build a road to Red River, and are already at work. Their starting-point is at Thunder Bay, about 3½ miles east of Fort William. Its construction is under the superintendence of W. Dawson, C.E., and is being pushed forward as fast as possible—90 men being employed at present. The road is being cut out 24 ft. wide, the bed 16 ft., and is well grubbed, graded, and ditched; the bridges are wide, and substantially built; between 5 and 6 miles are already completed so that a buggy can be driven over it. They have 34 miles to build to their first lake communication—Dog Lake. Here they have a force of some 40 men at work damming Dog River, so as to raise Dog Lake, and make it navigable. This will give them a water communication of 35 miles to the head of the lake, then a few more miles of road to build, and they reach Mill Lac, or the Lake of a Thousand Islands—thus, by using the lakes, they have but 184 miles of road to build on the whole route of between 600 and 700 miles.

SILVER MINING IN THE UNITED STATES.—The Central Pacific Railroad, from Sacramento, California, to Salt Lake City, has passed the Sierra Nevada mountain range, and is now pushing onward in the valleys of the Truckee and the Humboldt Rivers. Upwards of 15,000 Chinese are working constantly upon this road, and, having overcome all the great difficulties, they are quite safe in predicting that the cars will be running to the great bend of the Humboldt River early next summer. Then the silver mines of Idaho, noticed in the Journal of June 22 last, will have the benefit of transportation by the rail and the increase of emigration that is induced by railway facilities. Surely, mining enterprise must be revived in England under such favouring circumstances.

COAL IN INDIA.—At the Bombay, Baroda, and Central India Railway meeting, the directors stated that the cost of fuel still continued to be very great. If they could obtain coal in the country, as the East India Railway Company did, they could have saved 45,000*l.* last year under that head; and if they could have obtained wood as the Madras Company did, they could have saved 25,000*l.* But their coal had cost them 66*s.* a ton. They had, however, contracted for a supply of Australian coal at 48*s.* 9*d.*

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